

Quantum Technology for Clocks, Sensors, and Information Processing (Abstract)

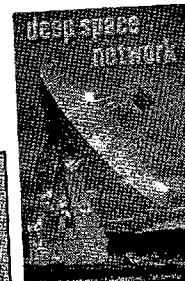
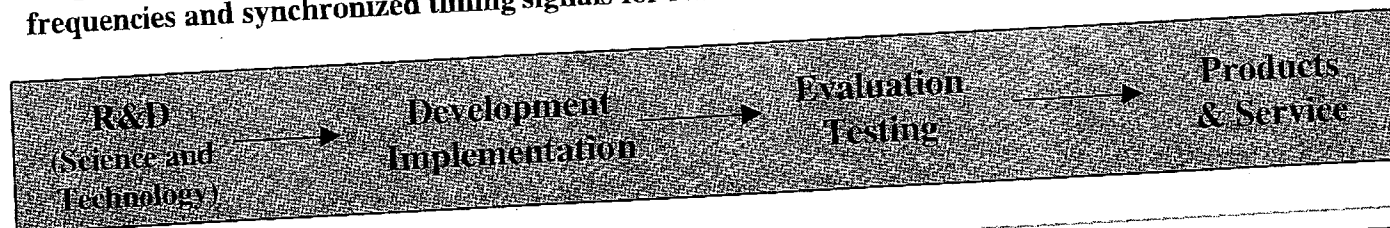
The Time and Frequency Sciences and Technology Group of Telecommunications Science and Engineering Division at Jet Propulsion Lab is engaged in a wide variety of research and development activities in the areas of time and frequency standards, precision metrology, quantum sensors, quantum information processing and communication, and micro-resonator technology for single photon generation.

As the major quantum-technology lab at JPL, we are particularly interested in utilizing quantum properties to enhance clock and sensor performances. Current NASA funded research programs include next-generation GPS atomic clocks, atomic clocks in space, extremely low-noise microwave source, quantum atom-interferometer gravity gradiometer, micro-sphere-based oscillator and sensor technology, and BEC.

We are interested and actively pursuing other quantum technology developments such as guided-wave atomic gyroscope, BEC generation and implementation, quantum qubit and logic realization and networking with trapped ions in cavity, and non-classical photon source generations in micro spheres.

# Time and Frequency Sciences and Technology Group at JPL

Responsible for technology development, generation, and distribution of ultra-stable reference frequencies and synchronized timing signals for NASA's Deep Space Network (DSN).



## Major research and technology development:

- Linear Ion Trap Standards (LITS)
- *GPS LITS: Space version of LITS*
- Cryogenic Sapphire oscillators (CSO)
- Stabilized Optical Fiber microwave link (FODA)
- *Opto-Electronic Oscillator (OEO)*
- Micro spheres
- Trapped single ion experiment
- Laser Cooling and Atomic Physics (LCAP)
- Space clocks - *Primary Atomic Clock in Space (PARCS)*, *Rubidium Atomic Clock Experiment (RACE)*
- *Bose-Einstein Condensate (BEC) generation*
- *Quantum Interferometer Gravity Gradiometer (QUIGG)*

